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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,718	10/14/2003	George Shih	81044317 (#202-0587)	4278

32997 7590 06/28/2006

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EXAMINER	
CHAUDHRY, SAEED T	
ART UNIT	**PAPER NUMBER**
1746	

DATE MAILED: 06/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/684,718	SHIH ET AL.	
	Examiner	Art Unit	
	Saeed T. Chaudhry	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *17-25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant's amendments and remarks filed April 13, 2006 have been acknowledged by the examiner and entered. Claims 1-25 are pending in this application. Of the above claims 17-25 are withdrawn from consideration.

Applicant's election without traverse of Group I, claims 1-16 in the reply filed on April 13, 2006 is acknowledged.

Claim Rejections - 35 USC § 112

Rejection of claim 7 under 35 U.S.C. § 112, second paragraph, has been withdrawn in view to amendments filed April 13, 2006.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made

The factual inquiries set forth in Graham v. John Deere Co., 148 USPQ 459, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or unobviousness.

Claims 1-3, 5-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kralick in view of Light.

Kralick (6,316,137) disclose a method of cooling a fuel cell stack by circulating coolant through the fuel cell stack through a cooling circuit (see col. 1, lines 47-51, col. 2, line 58

through col. 3, line 54 and claims). The reference fails to disclose a method of flushing and circulating coolant through a cooling circuit.

Light (5,094,757) disclose a method for removing contaminants from a cooling circuit by flushing the cooling circuit and filling the cooling circuit with a volume of coolant.

Two quick-connect hoses from the system are attached to the vehicle in a manner which provides maximum cross system flow, usually the radiator filler neck and an opposing hose. The coolant in being cleansed and rejuvenated flows through two cycles i.e. a flush cycle and a fill cycle. The contaminated coolant in the flush tank is re-circulated from the vehicle through a flush tank refinery and back to the vehicle. The flush cycle has a treating time of approximately 15 minutes but may be run for a longer period. In the fill cycle, the cleansed coolant is pump-circulated to the vehicle from the fill tank and back to the flush tank. During the fill cycle, the now cleansed circulating coolant is fed from the flush tank to the fill tank. At the time of flush cycle, the pressure of the system is monitored (see col. 2, lines 8-9).

With reference to FIG. 1 of the drawings, the system in general is indicated by 10. Two quick-connect hoses 11 and 23 are attached to any opposing hose and radiator filler neck respectively of the vehicle or an internal combustion engine cooling system to be flushed and filled. The system of the invention is turned on along with the engine of the cooling system to be flushed and filled. The contaminated coolant is pumped through hose 11 to a filter 13 where solids in the contaminated coolant are collected in a bag filter later to be removed. The contaminated coolant then passes through pipe 14 to the flush tank 16 where the contaminated coolant passes from bottom to top through the electrostatic precipitator 17 and out the bottom of flush tank 16, through pipe 18, open valve 19, pump 21, (pressurized holding tank) and hose 23

to the vehicle. A constant level of coolant is maintained in the flush tank (see col. 1, lines 50-67, col. 2, lines 48-64). The reference fails to disclose a method of flushing a fuel cell cooling circuit.

It is well known in the art to use a cooling circuit for cooling a fuel cell by circulating a coolant through the heat exchanger of the fuel cell as disclosed by Kralick. It is also well known in the art of heat exchanger that circulating coolant through the heat exchanger produce scale and contamination in the cooling coils, which reduces the heat exchange capacity of the heat exchanger and the heat exchanger need cleaning. Light discloses such as method for cleaning heat exchanger of a vehicle, wherein the engine produces heat and coolant circulating through the heat exchanger reduce the heat in the engine. The same concept is used in the fuel cell, wherein fuel cell produce heat and heat is reduce by circulating through the coolant through the heat exchanger. Therefore, it would have been obvious at the time applicant invented the claimed process to incorporate the cited steps of flushing and filtering the contaminants from the coolant as disclosed by Light for flushing and filtering the fuel cell cooling circuit as disclosed by Kralick to enhance the efficiency of the heat exchanger of the fuel cell. Further, one of ordinary skill in the art would block the flow of liquid to the filter to prevent the filter to be contaminated. Furthermore, one of ordinary skill in the art would heat the coolant because high temperature of the cleaning liquid is known to be more effective for the removal of the contaminations. The pump 21 still read on the holding tank, since pump hold a liquid and pressurized the liquid in the holding space.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kralick in view of Light as applied to claim 3 above, and further in view of Yamada.

Kralick and Light were discussed supra. However, the references fail to disclose a de-ionization filter.

Yamada (6,887,608) discloses fuel cell having a circulation circuit and utilize a deionization filter 62 to cause a decrease in an electric conductivity (see col. 9, lines 1-5).

It would have been obvious at the time applicant invented the claimed process to incorporate a deionization filter as disclosed by Yamada in the process of Light to reduce the electric conductivity of the coolant.

Claims 1-3, 5-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Oko et al in view of Light.

Oko et al (2001/0049033) disclose a method for removing contaminants from a fuel cell flow channels by flushing a volume of the liquid into the fuel entrance, where the liquid volume is greater than an amount of space within the stack available for liquid. The flushing liquid is deionized water (see [0058]). The reference fails to disclose a step of filling the cooling circuit with coolant and circulating the a volume of coolant external to the cooling circuit.

Light (5,094,757) disclose a method for removing contaminants from a cooling circuit by flushing the cooling circuit and filling the cooling circuit with a volume of coolant.

Two quick-connect hoses from the system are attached to the vehicle in a manner which provides maximum cross system flow, usually the radiator filler neck and an opposing hose. The coolant in being cleansed and rejuvenated flows through two cycles i.e. a flush cycle and a fill cycle. The contaminated coolant in the flush tank is re-circulated from the vehicle through a flush tank refinery and back to the vehicle. The flush cycle has a treating time of approximately 15 minutes but may be run for a longer period. In the fill cycle, the cleansed coolant is pump-circulated to the vehicle from the fill tank and back to the flush tank. During the fill cycle, the

now cleansed circulating coolant is fed from the flush tank to the fill tank. At the time of flush cycle, the pressure of the system is monitored (see col. 2, lines 8-9).

With reference to FIG. 1 of the drawings, the system in general is indicated by 10. Two quick-connect hoses 11 and 23 are attached to any opposing hose and radiator filler neck respectively of the vehicle or an internal combustion engine cooling system to be flushed and filled. The system of the invention is turned on along with the engine of the cooling system to be flushed and filled. The contaminated coolant is pumped through hose 11 to a filter 13 where solids in the contaminated coolant are collected in a bag filter later to be removed. The contaminated coolant then passes through pipe 14 to the flush tank 16 where the contaminated coolant passes from bottom to top through the electrostatic precipitator 17 and out the bottom of flush tank 16, through pipe 18, open valve 19, pump 21 and hose 23 to the vehicle. A constant level of coolant is maintained in the flush tank (see col. 1, lines 50-67, col. 2, lines 48-64). The reference fails to disclose a method of flushing a fuel cell cooling circuit.

It would have been obvious at the time applicant invented the claimed process to incorporate the cited steps of circulating a coolant from a external tank and filling the coolant after flushing the cooling circuit as disclosed by Light into the process of Oko et al for the purpose of efficient removal of the contamination because circulating the coolant through the channels would perform better cleaning. One of ordinary skill in the art would use heated coolant because high temperature of the coolant is known to increase dissolving effect. Further, one of ordinary skill in the art would block the filter during circulation to prevent the filter to be contaminated with contamination. Light discloses to monitor the pressure during the circulation. Therefore, one of ordinary skill in the art would monitor the pressure for efficient results. The

pump 21 still read on the pressurized holding tank since the pump holds and pressurized the liquid.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oko et al in view of Light as applied to claim 3 above, and further in view of Yamada.

Oko et al and Light were discussed supra. However, the references fail to disclose a de-ionization filter.

Yamada (6,887,608) discloses fuel cell having a circulation circuit and utilize a deionization filter 62 to cause a decrease in an electric conductivity (see col. 9, lines 1-5).

It would have been obvious at the time applicant invented the claimed process to incorporate a deionization filter as disclosed by Yamada in the process of Light to reduce the electric conductivity of the coolant.

Response to Applicant's Arguments

Applicant argued that Kralick in view of Light fails to teach or suggest a method comprising "... (A) flushing [a] cooling circuit by distributing coolant from a coolant storage tank to a holding tank and from the holding tank to the cooling circuit ...".

This argument is not persuasive because Light discloses flushing a circulating liquid from a storage tank (16) to a holding tank (21) which is pressurized and from the holding tank to the cooling circuit as claimed herein. Therefore, it would have been obvious at the time applicant invented the claimed process to use Light process steps for cleaning a fuel cell cooling circuit as disclosed by Kralick because it is known in the art to flush and circulate the cleaning liquid through a heat exchanger for removing contamination and to increase heat capacity of the heat exchanger.

Applicant argued that Kralick in view of Light fails to teach or suggest a method comprising "... (A) connecting [a] cooling circuit to an external coolant flushing system having

a coolant storage tank and a pressurized holding tank connected to the coolant storage tank for flushing the cooling circuit; (B) circulating a volume of coolant from the coolant storage tank to the pressurized holding tank and from the pressurized holding tank to the cooling circuit ...".

This argument is not persuasive because Light discloses connecting cooling circuit to an external coolant flushing system (10) having a storage tank (16) a pressurized holding tank (pump, 21) connected to the coolant storage tank (16) for flushing and circulating a volume of coolant from the pressurized holding tank to the cooling circuit as claimed herein. Therefore, it would have been obvious at the time applicant invented the claimed process to use Light process steps for cleaning a fuel cell cooling circuit as disclosed by Kralick because it is known in the art to flush and circulate the cleaning liquid through a heat exchanger for removing contamination and to increase heat capacity of the heat exchanger.

Applicant argued that Oko et al in view of Light fails to teach or suggest a method comprising "... (A) flushing [a] cooling circuit by distributing coolant from a coolant storage tank to a holding tank and from the holding tank to the cooling circuit ...".

This argument is not persuasive because Light discloses flushing a circulating liquid from a storage tank (16) to a holding tank (21) which is pressurized and from the holding tank to the cooling circuit as claimed herein. Therefore, it would have been obvious at the time applicant invented the claimed process to use Light process steps for cleaning a fuel cell cooling circuit as disclosed by Oko et al because it is known in the art to flush and circulate the cleaning liquid through a heat exchanger for removing contamination and to increase heat capacity of the heat exchanger.

Applicant's argument that the Oko et al in view of Light fails to teach or suggest a method comprising "... (A) connecting [a] cooling circuit to an external coolant flushing system having a coolant storage tank and a pressurized holding tank connected to the coolant storage tank for flushing the cooling circuit; (B) circulating a volume of coolant from the coolant

storage tank to the pressurized holding tank and from the pressurized holding tank to the cooling circuit ...", is not persuasive because Light discloses connecting cooling circuit to an external coolant flushing system (10) having a storage tank (16) a pressurized holding tank (pump, 21) connected to the coolant storage tank (16) for flushing and circulating a volume of coolant from the pressurized holding tank to the cooling circuit as claimed herein. Therefore, it would have been obvious at the time applicant invented the claimed process to use Light process steps for cleaning a fuel cell cooling circuit as disclosed by Kralick because it is known in the art to flush and circulate the cleaning liquid through a heat exchanger for removing contamination and to increase heat capacity of the heat exchanger.

Applicant's arguments filed April 13, 2006 have been fully considered but they are not persuasive.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

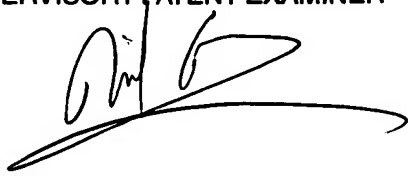
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saeed T. Chaudhry whose telephone number is (571) 272-1298. The examiner can normally be reached on Monday-Friday from 9:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Michael Barr, can be reached on (571)-272-1414. The fax phone number for non-final is (703)-872-9306.

When filing a FAX in Gp 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Saeed T. Chaudhry
Patent Examiner

MICHAEL BARR
SUPERVISORY PATENT EXAMINER